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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/782,935	02/23/2004	Ralf Lindner	Q79846	7686
23373 7590 09/07/2007 SUGHRUE MION, PLLC 2100 PENNSYLVANIA AVENUE, N.W. SUITE 800 WASHINGTON, DC 20037			EXAMINER LAZORCIK, JASON L	
			ART UNIT 1731	PAPER NUMBER
			MAIL DATE 09/07/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

Application No.

10/782,935

Applicant(s)

LINDNER ET AL.

Examiner

Jason L. Lazorcik

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 22 June 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-3,5-15,30, 31 and 32-37 is/are pending in the application.
- 4a) Of the above claim(s) 32-37 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3,5-15,30 and 31 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 6/26/2007.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- ☐ Notice of Informal Patent Application
- ☐ Other: \_\_\_\_\_.

**DETAILED ACTION**

***Election/Restrictions***

Newly submitted Claim 32-37 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: The originally elected claims are drawn to a method of manufacturing a quartz glass material while the identified claims are drawn to a method of fabricating an optical element and a method of manufacturing an optical system. The inventions are substantially unrelated and a consolidated search of all presented inventions would present a significant burden upon the office.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claim 32-37 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-3, 5-15, and 30-31 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

With respect to Claims 1, 30, and 31, the precise metes and bounds of the term "energy densities of the order of the working energy densities of optical systems for microlithography" is unclear and indefinite. Specifically, said term is understood to vary among related systems and potentially to vary even within a given system. Stated alternately, since microlithographic optical systems are subject to technological advancement, it is reasonable to expect the working energy densities of these systems to likewise vary with changes in the underlying technology. For at least this reason, Applicants reference to "the working energy densities of optical systems for microlithography" is indefinite with respect to time. Due to the aforementioned deficiency, the scope of the instant claim and therefore the scope of patent protection sought by Applicant are rendered unclear and indefinite.

Further with respect to Claim 1, the particular metes and bounds of the term "environment" in the production flame are unclear and indefinite. While it is clear to one of ordinary skill that for instance gas composition would be considered a variable which contributes to the "environment" of the flame, it is unclear precisely what other factors Applicant intends to encompass by the instant term. For example, temperature, pressure, and ambient electrical/magnetic fields could all reasonably be encompassed by the term "environment". The point here is that simply stating that control is provided over the "environment" of a flame renders the particular scope of patent protection unclear and indefinite.

As previously presented, the limitation as recited in Claim 11, lines 2-3 wherein "the local hydrogen concentration profile is matched to a local distribution of the energy

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densities when the quartz glass material is in use" is understood to vary in accord among different end use applications. Specifically, the hydrogen profile would be variable dependent upon an intended use of the material (e.g. when the material is "in use for microlithography"). Much like the rejection of Claims 1, 30, and 31 above, the instant limitation attempts to define a definite property (e.g. a hydrogen concentration profile) by referencing an ill-defined and indefinite application (e.g. "when the...material is in use for..."). For this reason, the particular metes and bounds for which applicant seeks patent protection are rendered unclear and indefinite.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claim 1-3, 5-15, and 30-31 rejected under 35 U.S.C. 103(a) as being unpatentable over Yamagata (US 5,086,352) in view of the analogous prior art teachings of Borrelli (US 2002/0194869 A1).

Regarding Claim 1, Yamagata teaches the fabrication of a fused silica (or alternately a quartz glass member) with an enhanced resistance to excimer laser damage in the wavelength range from 360nm to 150nm (column 5, Lines 9-24). Further as set forth in the reference Claim 7, the disclosed method results in a material "substantially free from oxygen defects" or that "the concentration of deficient oxygen atoms and excess oxygen atoms (peroxy-linkages) in the glass matrix...are lower than the limits of detection" (Column 12, Lines 9-15).

With respect to Claims 2-3, the instant reference clearly indicates that the glass material may be produced by either direct deposition (Column 10, Lines 1-3) or by a soot process (Column 10, Lines 28-30).

Regarding Claim 8, the instant reference teaches hydrogen gas concentrations in the final product between  $5 \times 10^{16}$  to  $5 \times 10^{19}$  (molecules/cm<sup>3</sup>). This disclosure is understood to read upon the indicated claim where the indicated concentration of  $5 \times 10^{16}$  molecules/cm<sup>3</sup> is understood to be "in a range of less than about  $10^{16}$ /cm<sup>3</sup>"

With respect to Claims 9 and 14-15 Yamagata discloses that " the ingots were subsequently heated under a hydrogen gas atmosphere at a pressure of 10 atmospheres in the same electric furnace at about 500° to 900°C" (Column 22, Lines 13-20).

Concerning Claims 10 and 11, the Yamagata reference Teaches that the manufacture process produces a "doping defined concentrations of hydrogen molecules, depending on the wavelength of the ultraviolet light involved" (Column 7, Lines1-14).

Claims 12, 13, and 30-31 are set forth by the instant reference wherein it is disclosed that "the blank is made of a high -purity synthetic silica glass material ...which contains concentrations of OH groups and chlorine (Cl) distributed therein" (Column 6, Lines37-52). Yamagata further teaches that the halogen containing material is introduced at least during the deposition process (Column 10, lines 13-16).

While Yamagata does teach the fabrication of a glass substantially free from peroxy defects, the reference is silent regarding an explicit control over the ozone concentration in the flame. With this point in mind, Borrelli teaches that "it has been found that the more oxidizing the flame used to make the glasses the more 260 nm absorption is produced with laser irradiation...One model for the formation of the 260 absorption involves the reaction of dissolved molecular oxygen with light to give oxygen atoms. The reactive oxygen atoms further react with molecular oxygen to give ozone (260 nm absorption)...Regardless of the mechanism of formation it is important to note that the 260 nm absorption is related to the molecular oxygen content of the glass." (Pg1, ¶[0010-0011]).

In light of the Borrelli disclosure, it would have been obvious to one of ordinary skill in the art at the time of the invention to seek to minimize or substantially eliminate

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the highly oxidative species of ozone from the fused silica deposition zone. One obvious method to reduce the effect of the molecular oxygen in the reaction zone would have been to dilute the reactive species with a substantially inert carrier gas like nitrogen. Since nitrogen is a principle constituent of air, diluting the reaction gasses with "cold air" would have been an obvious choice for one of ordinary skill in the art at the time of the invention seeking reduce the oxidizing character of the flame used to make the fused silica glass.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamagata (US 5,086,352) and Borrelli (US 2002/0194869 A1) as applied above and in further view of the analogous prior art teachings of and Moini (US 6,375,905).

Where substantial elimination of molecular oxygen is preferred to dilution of said reactive species, it would have been readily apparent to one of ordinary skill in the art at the time of the invention to utilize a catalytic decomposition of ozone as set forth by Moini (US 6,375,905). Specifically, Moini teaches the use of an ozone depleting catalyst layer which substantially depletes ozone from an atmosphere in contact there with (abs). In particular, the instant reference utilizes manganese dioxide as the principle catalyst in the same manner as in the applicants preferred embodiment as set forth on page 8 of the present specification. Therefore it would have been obvious for one of ordinary skill in the art at the time of the invention, recognizing the deleterious effects of oxidizing species in the reaction flame of a fused silica reaction, to seek to



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substantially eliminate highly oxidative ozone from the reaction zone by the catalytic removal process taught by Moini.

### ***Response to Arguments***

Applicant's arguments filed June 22, 2007 have been fully considered but they are not persuasive.

With respect to the rejection of claim 1 under 35 U.S.C. §112, second paragraph, Applicant argues that the term "energy densities of the order of the working energy densities of optical systems for microlithography" is both clear and definite and would therefore be understood by one of ordinary skill in the art. Applicant points to a reference by Algots which relates a range of energy densities utilized in the specific experimental procedure. While Applicant has provided a single showing of a working range of energy densities, the Examiner is unpersuaded on the issue of definiteness of the contested terminology.

Specifically as related in the rejection above, the operating parameters associated with lithographic systems indeed as with substantially any technology, are subject to alteration and refinement through successive innovations. Consequently, the "working energy densities" which are typically encountered in a commercial lithographic system today may be quite apart from the "typical" values encountered in an antiquated system or a lithographic system in the future. The key point here is that since the working energies would be reasonably expected to shift over time, so too does the

scope of Applicants claim. This is the essence of indefiniteness. The rejection under 112, second paragraph, is proper and stands as originally presented.

With respect to Claims 30 and 31, Applicant argues that Yamagata does not disclose or suggest that a halogen is incorporated into the glass material during the deposition or during a subsequent heat treatment process. The Examiner strongly disagrees. Applicant admits that Yamagata utilizes a halogen containing material during the deposition and that "the chlorine content...is explained by the fact that one of the starting substances...already contains chlorine atoms". It is clear even from Applicants own reading of the references that a halogen containing material is incorporated into the glass during the deposition process.

Applicant next argues that Yamagata does not teach or suggest minimizing the concentration of ozone during the quartz production. Although the instant argument is rendered moot by virtue of Applicants amendments, Examiner disagrees with the basis of this argument upon consideration of the Yamagata reference. Specifically Yamagata teaches a method of producing a glass which is essentially free of peroxy defects. A reading of the Borelli reference teaches that minimization or elimination of reactive oxygen species is essential to eliminating these peroxy defects. The burden therefore shifts to Applicant to provide evidence showing that formation of the quartz glass, which is substantially peroxy defect free, according to the Yamagata reference does not implicitly or inherently result in minimization of the ozone concentration.

Next, Applicant argues that Borelli does not teach minimization of the ozone content during quartz production. Applicant then acknowledges that the Borelli reference teaches reducing the concentration of molecular oxygen (e.g. reactive oxygen) from the production process, but asserts that this does not teach or suggest minimization of the ozone content. Examiner strongly disagrees. As presented in the previous office action, Borelli teaches the minimization of reactive oxygen in the deposition flame. Borelli then discloses that "The reactive oxygen atoms further react with molecular oxygen to give ozone (260 nm absorption)". It follows that by teaching control over the flame conditions to minimize reactive oxygen species according to Borelli is simultaneously teaching a process of minimizing ozone concentration in said flame.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the

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shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason L. Lazorcik whose telephone number is (571) 272-2217. The examiner can normally be reached on Monday through Friday 8:30 am to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Griffin can be reached on (571) 272-1189. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JLL

  
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SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 1700

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